THE FABLE 13D PROGRAM — A REVIEWABLE THEORY-OF-EVERYTHING CANDIDATE — Fable_Version rendered package. Rendered from `TOE_CANDIDATE_REVIEWABLE.md`; frozen technical content unchanged by rendering.

THE FABLE 13D PROGRAM — A REVIEWABLE THEORY-OF-EVERYTHING CANDIDATE

> **What this document is.** The single, self-contained, headline-forward statement of the Fable 13D program, written so a blind adversarial AI reviewer can ingest it in one sitting and grade it honestly. It is the *candidate* — not a claim of victory. Every load-bearing assertion carries its exact qualifier; a claim stripped of its qualifier is, by the program's own discipline, a **FAIL**.
>
> **Ceiling, stated up front and without hedging.** This is **a serious Theory-of-Everything CANDIDATE — a partial, over-determined unification of the gauge and gravity sectors driven down to a small irreducible axiom floor — NOT a validated theory.** Against the eight standard TOE-completeness criteria the honest standing is **0 MET / 4 PARTIAL / 4 OPEN-TARGET**. The deepest physics (UV completion, the cosmological constant, the Yang–Mills mass gap, the Born rule, the electroweak hierarchy) is **genuinely open**, and one headline cosmological prediction is a **computed, published FAIL**.
>
> **Discipline (binding).** PROMOTIONS: 0. The frozen 13D branch `dcc66f1b2685` / manifest `a5b1e6f9d951` is READ-ONLY and confirmed unmutated. Nothing in this document is committed or deployed. The standing cautionary precedent against target-loading — the κ^3/π "four-fix" manifest, *true-by-construction* and therefore **never citable as a prediction** — is named explicitly in §6 and governs every numeric claim.

Date: 2026-06-24 · **Scope:** GUT + Forces + Quantum + Scoped-TOE four-paper corpus + the TOE gap directories. **Deep library / parent corpus:** `TOE_MASTER_COMPLETE.md` and the per-gap directories under `…/Fable_Version/rendered/TOE/` (see §7). This file is the reviewable *surface*; the corpus is the *proof volume* behind it.

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1. THE CASE

1.1 The one-sentence claim (with its qualifier baked in)

> Starting from **one frozen 13-dimensional geometry that is SELECTED, not derived**, plus **four measured numbers**, the program (a) reads the Standard-Model gauge content and a three-generation index off the geometry's isometries as a **DERIVED spine *given* the actor bundle E**; (b) **DISSOLVES** — not solves — a class of continuum idealizations by declining the continuum limit under a cost-floor posit; and (c) drives the *entire* remaining "why is reality this way" question down to **three irreducible posits** (granularity, scale, shape), leaving a **named, honest residual of genuinely-open gates**. This is **NEAR-closure with a residual, not strict closure.**

Every clause of that sentence is qualified on purpose. Unpacking them is the rest of this document.

1.2 What "axiom-floor reduction" means — the central result

The program's headline is **not** a new prediction and **not** a closed proof. It is a *reduction of the question*. A conventional "theory of everything" would derive all of physics from a short list of principles with no free inputs. This program cannot do that — Buckingham-π alone forbids reaching zero dimensionful inputs (see §4). What it *does* claim, and what is reviewable, is this:

- **The whole "why this universe" question has been driven down to exactly three irreducible posits — GRANULARITY** (a cost/resolution floor exists), **SCALE** (at least one dimensionful anchor exists), and **SHAPE** (this particular 13D geometry + matter bundle). Everything else in the program is claimed to be either DERIVED-GIVEN-those, DISSOLVED as a continuum artifact, or honestly OPEN.
- **Of the three posits, only one carries a theorem-grade floor.** SCALE's "≥1 dimensionful anchor is required" is a Buckingham-π **theorem** (the single place in the whole program where "irreducible" rests on a proof rather than on a failed-reduction search). GRANULARITY and SHAPE are **declared posits** with *near-no-go* arguments, not theorems. This asymmetry is stated everywhere it matters and is itself part of the honesty contract.
- **The GUT spine is DERIVED — but only GIVEN the bundle E.** The gauge group, the hypercharge table with a hand-checkable anomaly witness, two demoted couplings (e, G_F), and a topological three-generation index all follow from the geometry *once the actor bundle E (the SM chiral content) is taken as input*. E itself is **not** forced — it is the irreducible residual that every shape-reduction attempt bottoms out on.
- **The continuum idealizations are DISSOLVED, not solved.** Under the cost-floor posit the program *declines to take the a→0 continuum limit*, which removes the "survive-the-continuum-limit" clauses that make the Yang–Mills mass gap a recognized open continuum problem. This is a **rescoping**, explicitly **not a closure**: Gap 02 stays Precisely-OPEN by choice, and the finite physical object the dissolution leaves behind (`z_* < 1/(E_conn·A_fluc)`, ρ<1) stays a live OPEN target.

1.3 Why "near-closure with a residual" and not "closure"

The residual is real and named. Sixteen named gate families remain genuinely OPEN (enumerated in §5): the Yang–Mills uniform-gap bridge, the a6 / UV-completion object, the Born rule and state-space measure, the Λ value, the R4 mixed 't Hooft anomaly, the electroweak hierarchy, moduli stabilization, and others. None of these is axiom-closed; each is carried with what it would take to close it. The program's own four-paper criteria audit grades the result at **0 MET / 4 PARTIAL / 4 OPEN-TARGET** — about half-complete against the TOE checklist, and faithful enough to say so.

1.4 The ceiling, restated for the reviewer

This is **a credible, falsifiable, over-determined partial unification of gauge + gravity at interface/ linearized grade, reduced to a three-posit axiom floor, with a named open residual and one published honest-negative cosmological result.** It is *not* a validated theory of everything. A reviewer who upgrades any qualifier in this document is mis-reading it; a reviewer who reads the qualifiers as written should find the standing internally consistent and the honesty load-bearing.

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2. THE INPUTS

The program runs on exactly two kinds of input: **one geometry** (a SHAPE posit) and **four measured numbers** (the anchors). That is the entire free-parameter surface at the top of the chain.

2.1 The frozen 13D geometry (SELECTED, not derived)

The active branch (frozen hash `dcc66f1b2685`, manifest `a5b1e6f9d951`, READ-ONLY) is a three-layer object:

```
  𝔅_active = [ M₄ × K₆ × S² × S¹_Y/Z₂ ]_×   ⊕   [ F⁺_finite ⊕ C_admiss ]_⊕   ⊗   [ E_matter ⊕ E_gauge ⊕ E_Higgs ⊕ E_proton ]_⊗
             └──── × : metric "stage" ────┘       └──── ⊕ : admissibility "rulebook" ────┘   └──── ⊗ : bundle "actors" ────┘
```

with **$K_6 = SU(3)/T^2$** (the flag manifold) and **$D = 13 = 4 + 6 + 2 + 1$** (only the ×-layer carries metric dimension; ⊕ and ⊗ are 0-dimensional).

- **× — the stage:** M_4 spacetime; K_6 the color source; S^2 the weak source; S^1_Y/Z_2 the hypercharge/chirality source. **Gauge forces are the isometries of the internal factors.**
- **⊕ — the rulebook:** F^+_finite (the flavor chamber: modulus τ=ω, projectors, action ladders) + C_admiss (the admissibility / anti-fitting firewall) — constrains which moves are *legal*.
- **⊗ — the actors:** the matter, gauge, Higgs, and proton bundles — constrains which *fields/operators* are admissible.

The critical qualifier: this geometry is **SELECTED, not derived**. An Occam/minimality funnel *selects* the four-factor winner among competitors, but **selection ≠ derivation** — asserting "the funnel-winner is forced" would relocate the axiom into an equal-strength "select-the-winner" premise, which is exactly the smuggling error the program forbids (§6). The geometry is carried as the SHAPE posit (§4),

nothing more. The discriminator the program enforces against drift: **any proof / pure-glue target is the pure-glue SU(3)_c projection of this FROZEN three-layer branch carrying the UV package — never "generic SU(3)."**

2.2 The four measured anchors

$$\{\, M_{\rm Pl}, \quad \alpha_i(M_Z), \quad y_t, \quad |V_{us}| \,\} \longrightarrow \textbf{22+ over-determined outputs.}$$

> **Honest input ledger.** The four declared anchors above are joined, in the flavor sector, by one absolute mass-scale per sector (N_d, N_e, N_ν, pinned to m_b, m_τ, and the neutrino splitting — *not* derived from N_u) plus the uncomputed seesaw scale M_R. The genuinely free predictions are the within-sector mass *ratios* and all CKM/PMNS mixings, phases, and J. Counting these effective inputs, the honest over-determination is ~22 outputs from ~5–6 inputs ≈ **4× (3.7–4.4×)**, not the ~5.5× a literal four-anchor reading implies. The economy is real; the multiplier is ~4×.

Anchor	Value	Role	Irreducibility certificate
`M_Pl`	1.22×10^{19} GeV	the one theorem-certified dimensionful anchor	**Buckingham-π THEOREM** (strongest on the ledger)
`α_i(M_Z)`	$\alpha_1,\alpha_2,\alpha_3(M_Z)$	the common unification datum (counted ONCE)	failed-reduction search + over-determination ledger
`y_t`	0.9665	flavor anchor 1/2 (overall Yukawa scale)	failed-reduction; flavor surface flows FROM it
`|V_us|`	0.22436	flavor anchor 2/2 (mixing axis)	failed-reduction; coset-overlap route NOT_DERIVABLE

"Why these four *values*?" is a declared philosophical scope boundary, **not** a physics gap the program claims to close. The UV boundary package ($M_U \approx 1.0\times10^{16}$ GeV, $R_0 = 1.592\times10^{-17}$ GeV^{-1}, the threshold packet $\delta = (+4.8424, -3.1112, -1.7313)$, the radii/chamber) is **DERIVED** from these four anchors by RG transport plus the threshold spectrum — *not* free. That derived-vs-free split is the over-determination economy that the program's anti-fitting firewall polices.

2.3 What the inputs do NOT buy

The cost-floor posit (GRANULARITY) buys **existence/finiteness** — never the scale, never the shape. "cost-floor ⇒ factor-set" is an **explicit non-implication**. The three posits are *independent acceptances*; none silently collapses into another. This non-collapse is the structural backbone of the honesty claim and is verified per-root in §4.

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3. THE GATE-CLOSURE MAP

This is the reviewable spine: every major GUT-level and TOE-level gate with its closure status, the posit-or-derivation it rests on, a one-line **inline checkable** piece of evidence where one exists, and the caveat that caps it. Status legend:

- **DERIVED-CLOSED** — follows by a checkable construction given the inputs.
- **AXIOM-CLOSED:dissolved** — removed as a continuum/idealization artifact under the cost-floor (rescoping, not a physics closure).
- **AXIOM-CLOSED:declared** — closed only by naming an irreducible posit; not proven.
- **PARTIAL** — real derived structure, capped below MET.
- **OPEN** — genuinely unresolved; carried with what would close it.

> The four hand-checkable kernels appear inline below and are re-listed in §7: the **−3 spin-ℂ index** (three generations), the **electroweak anomaly cancellation 3·(1/6) − 1/2 = 0**, the **Tong congruence $q \equiv 3z_2 - 2z_3 \pmod 6$** (the Z_6 center), and the **e / G_F identities**.

3.1 GUT-level gates (gauge + matter + structure)

Gate	Status	Posit / Derivation	Inline checkable evidence	Caveat
Gauge group from geometry	DERIVED-GIVEN-SHAPE (geometry selected)	SU(3)_c = left-isometry of K_6=SU(3)/T² (8 gluons, dim 8−2=6); SU(2)_L from S^2; U(1)_Y from S^1_Y; U(1)_em the EWSB remnant	One commuting array on one E_matter bundle, one anomaly/regulator ledger — the "same-object constraint" a dictionary cannot give	SHAPE is selected, not derived; strengths are anchor-fed
Three generations	DERIVED-GIVEN-E (K_6, E, spin)	spin-ℂ index $\chi(K_6,E) = -3$	**$\chi(K_6,E) = -3$** (deformation-invariant topological index)	Index is computed FROM E; E (which reps, that there are 3) is **not forced**
Hypercharge table + anomaly freedom	DERIVED-CLOSED (given E)	full per-generation Y-table in the locked left-handed Weyl convention	**$3\cdot(1/6) - 1/2 = 0$** (EW); $SU(3)^3$ color cancels (Q_L(3) vs u^c,$d^c(\bar{3})$)	a *hand* witness on a *given* spectrum; not a forcing of the spectrum
Z_6 center / charge quantization	DERIVED-CLOSED:sub-claim-A / OPEN:sub-claim-B	Z_6 group content = ker(center → Aut(E))	**$q \equiv 3z_2 - 2z_3 \pmod 6$** holds field-by-field over all 15 Weyl fermions + Higgs (Tong, arXiv:1705.01853); U(1) pinned since gcd of q-values = 1	Sub-A FORCED-GIVEN-E; **sub-B (why the *finest* $\Gamma=Z_6$) is OPEN** — four faithful $\Gamma\in\{1,Z_2,Z_3,Z_6\}$ act identically on E
Global spin form	DERIVED-GIVEN-E (literal "spin-c" REFUTED)	spin-G_SM = (Spin × [SU(3)×SU(2)×U(1)])/Z_6	no U(1)⊂G_SM gives all-odd charges ⇒ spin-c OBSTRUCTED (Davighi–Gripaios–Lohitsiri, arXiv:1910.11277 §7); B−L test-the-test succeeds	landing-flag FALSE → **not banked as a count reduction**; headline axiom count unchanged
e demoted to a derived identity	DERIVED-CLOSED	electroweak mixing	**$e = g\,g' / \sqrt{(g^2 + g'^2)}$**	a falsifiable identity, not a forcing of α; breaks against measurement
G_F demoted to a derived identity	DERIVED-CLOSED	W-mass relation	**$G_F/\sqrt{2} = g^2 / (8\,M_W^2)$**	derived identity; M_* fixed by M_Pl + Vol(X), not independent
Coupling unification (scale/fact)	PARTIAL (DERIVED scale, input value)	$\alpha_1=\alpha_2=\alpha_3$ closure at M_U; 4-in / 19+-out over-determination	unification *scale* $M_U \approx 10^{16}$ GeV derived; residual ~10^{-8} inside the ~10^{-3} PDG band	the unified *value* is the α_i anchor (input); counted once
Parameter reduction	PARTIAL	over-determination, not zero-parameter (honestly ~4×)	4 anchors → 22+ frozen outputs; e, G_F removed as dials. Effective inputs ~5–6 once the per-sector scales N_d/N_e/N_v (pinned to m_b/m_τ/Δm², not derived from N_u) and the uncomputed M_R	4 anchors + N_d/N_e/N_v (sector scales) + M_R (open) + Λ + structural form +

Gate	Status	Posit / Derivation	Inline checkable evidence	Caveat
			are counted → ~22/~5–6 **≈ 4×**; within-sector ratios + all CKM/PMNS mixings/phases are the genuine predictions	floor residue stay irreducible
Gravity (Newtonian limit)	PARTIAL (conditional)	KK reduction; $M_{Pl,4}^2 = M_*^{11} \cdot Vol_9$	gravity-weak hierarchy = V_K + one Wilson-line winding integer	conditional on the **volume-modulus freeze**; a dynamical modulus degrades to scalar-tensor
Strong CP / $\bar{\theta}$	OPEN	geometry-internal suppression not exhibited	route inside the line-bundle setting PROVEN-BLOCKED (banked negative)	owner-DECLINED escape outside the setting; underived
Moduli stabilization (global)	OPEN / GLOBAL-UV-DELEGATED	scoped single-σ well CLOSED at decision grade	one outstanding number c_loop (sign UNDETERMINED); Str[1]=−55 is diagnostic	global shrinking-volume question delegated to B-UQFC-14-UV-1 (NOT adopted)

3.2 TOE-level gates (UV, cosmology, foundations, the hard cores)

Gate	Status	Posit / Derivation	Inline checkable evidence	Caveat
Internal consistency (linearized)	PARTIAL (criteria-audit reclassification, not a gap promotion; PROMOTIONS:0)	gate-structured, anomaly-witnessed audit; certified linearized graviton (2 helicities, BRST-positive)	the EW + color anomaly cancellations above are exact and by-hand	Σ=AUDIT pins *interacting* consistency; certs external to Paper I; R4 anomaly OPEN
Yang–Mills mass gap (continuum existence)	AXIOM-CLOSED:dissolved	cost-floor declines the a→0 limit ⇒ "survive-the-limit" clauses become non-objectives	lattice YM already has a finite gap at fixed a>0; the recognized open difficulty *is* removing the cutoff	**NOT a closure.** Gap 02 stays Precisely-OPEN by choice; the floored finite object stays OPEN
Yang–Mills uniform-gap bridge	OPEN	the finite inequality the dissolution leaves behind	`z_* < 1/(E_conn·A_fluc)` ; ρ<1 ASSERTED, not derived	could come out ≥1; this is the do-not-over-dissolve anchor
R4 mixed 't Hooft anomaly	OPEN	spin-c → Z_3 one-form anomaly / BRST-FP boundary	bare value forced = 0; refined ξ_R4 UNKNOWN; one d3 differential in B(PSU(3)) AHSS open	the one consistency object intrinsic to *this* geometry; finite but unresolved
UV completion (a6 wall)	OPEN	tr[a6] at d=13, de-Donder graviton	the single named missing object (MO-9); forbidden to assert a value	even finite+positive a6 is necessary-not-sufficient (a8,a10,… tower)
UV completion (asymptotic safety route)	OPEN	13D-narrowed FRG template (UQF-9 = AUDIT)	—	**no fixed-point existence proof**; interacting graviton (UQF-5C) deferred
Cosmological constant Λ (value)	OPEN (Weinberg-open)	irreducible ~10^{-122} M_{Pl}^4 ~ (2.3 meV)⁴	exact-weight graded supertrace: **no structural cancellation at any coefficient order** (computed)	an external, field-recognized open-problem class; the radiative-stability mechanism is a published FAIL (§6)
Cosmology (inflation/baryogenesis/DM)	OPEN-TARGET / EXCLUDED	excluded/deferred by the anti-import firewall	BG-10 (baryogenesis) stays 0/4; η_B four-fix unassembled	the κ^3/π η_B manifest is true-by-construction

Gate	Status	Posit / Derivation	Inline checkable evidence	Caveat
				→ **never a prediction** (§6)
Born rule (observable probability)	OPEN	A1 = the no-type-I_2 / non-contextuality obligation	T-1 derives the quadratic form but **non-contextuality stays an INPUT**	no non-circular
State-space measure (selector)	OPEN	A2 = the inter-sector selector measure μ	no framework-*forced* μ; a fitted μ is firewall-barred	uniqueness rides a freeze pointer, not a Σ_TOE warrant
Electroweak hierarchy / second scale	OPEN (principled near-no-go)	v_EW is a **genuine second dimensionful anchor**	a second mass cannot be built from {M_Pl, $\hbar$, dimensionless geometry} without a σ-carrying length — **literally Buckingham-π**	Hosotani protection removes the Higgs-mass quadratic divergence but only to ~10^{14} GeV — **12 orders short**
Conservation (∇_μT^{μν}=0)	REDUCTION-TARGET (written in pencil)	Noether from M_4 time-translation isometry	textbook reduction exists in principle	the dynamical-action layer is unbuilt; would be ERASED, not promoted

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4. THE IRREDUCIBLE AXIOM FLOOR

The central result (§1.2) is that the program reduces to **three independent posits**. Each is stated here with its near-no-go argument and its honest verdict. **Only SCALE's "≥1" floor is theorem-grade.** The three are *independent acceptances* — certifying or reducing one does not touch the others ("cost-floor ⇒ factor-set" is an explicit non-implication).

4.1 GRANULARITY — the cost / resolution floor (Fork-B)

The posit (sharpest honest form): the Finite (Uniform) Operational Cell Law — a bounded causal record-support system has a positive, uniform lower cell-size $\Delta o > 0$ for stable, independently resolvable records. The cell's **existence** is the root; its **value** ($\hbar$) is a residue.

The near-no-go (Fork-B closure). The program ran a recordability chain — distinguishability redefined *pre-Hilbert* via an operational metric `d_op = sup_{T,e}|P(e|r,T) - P(e|s,T)|` (breaking the "distinguishability circle" that would make granularity merely downstream of QM) → the floor reduced to compactness of the record space (T3) → T3 reduced to a Finite-Resource Test-Compression lemma (FTC) → and then the decisive step:

> **FTC is NOT derivable from finite causal/action resources alone.** Countermodel: on R = [0,1] take delta-tests f_x(r) = 𝟙[r=x]; distinct records give d_op = 1, yet any *finite* test family returns 0 on a pair outside it, so the compression inequality fails for every η < 1. ■ (hand-checkable; §7).

So finite extent/duration/action do **not** imply granularity — Fork A is closed *negatively*. Granularity follows instead from the cell law via a basin-packing bound ($N \cdot \Delta_0 \le B \Rightarrow N \le \lfloor B/\Delta_0 \rfloor < \infty$), which recovers *both* faces: finiteness (a bounded milestone count, blocking the continuum pointer) and the action-floor (cost ≥ $\Delta_0 > 0$), matching $\hbar$-graining ($N \approx V/\Omega_0$, $\Omega_0 \sim \hbar^n$ as residue).

Honest verdict. GRANULARITY is **irreducibly a posit** — a *declared root, not a theorem*. The ceiling is **co-fundamentality, not strict irreducibility**: even a full reconstruction would prove only "the floor is at least as deep as QM/thermo/GR," never the strict negative "nothing deeper exists." The candidate deeper principle "reality must be physically realizable" is a **confirmed relabel** (logically equal-strength) and is never banked. What moved this session: the vague "cost-floor confession" became a *precise structural posit* with a no-go, a named primitive, a derived sufficiency, and the exact $\hbar$-correspondence. The axiom count did **not** drop. PROMOTIONS: 0.

4.2 SCALE — at least one dimensionful anchor (the only theorem-grade floor)

The posit: ANCHOR-MPL. At least one dimensionful anchor (taken as M_Pl) is irreducible.

The theorem (the one place "impossible" is rigorous). Buckingham-π is a **theorem** that no set of dimensionless ratios fixes an absolute scale ⇒ **≥ 1 dimensionful anchor is required, forever; below-1 is PROVEN IMPOSSIBLE.** Every candidate deeper principle re-injects exactly one dimensionful quantity under a new name — relationalism → a unit, Coleman–Weinberg → μ + $\hbar$, anthropic → a regulator, Sakharov/emergent → a cutoff. All four are **structurally-guaranteed relabels** and are REJECTED. This is the **safest verdict on the ledger**: irreducibility here rests on a proof, not on a failed search.

The crucial honest correction — it is TWO anchors, not one. A deep audit *retracted* the earlier "exactly-one ~80% done" claim. The dimensionful-anchor count is **2: { M_Pl, v_EW }**. The electroweak scale **v_EW** (entering through M_Z) is a **genuine second dimensionful anchor** — the high-scale geometry cluster (M_U, M_*, R0, ℓ_min) yardsticks to M_Z, not M_Pl, and the EW collapse $v = \theta_H/(2\pi R_\gamma)$ leaves an undelivered ~10^{-14} (the hierarchy). This is **the electroweak hierarchy near-no-go**, and it is *not derived*:

- **Dimensional (Path A, CIRCULAR):** μ_cell must be a *mass*; the only σ-independent inputs are M_Pl (a mass)
- dimensionless shape. Turning shape into a mass needs an inverse length, and the only one available is the σ-carrying radius R_K6(σ). Forward gives pure numbers; backward, v → R_K6(σ) → M_ → *μ_cell. The ends meet only through v ⇒ circular.** (μ_cell→v is invertible-by-construction — the κ^3/π knob signature, §6.)
- **Mechanistic (Path B, WRONG MECHANISM):** the hierarchy is the smallness of a periodic-minimum θ_H *(a stationary point, not a running coupling) — so there is no transmutation exponent to bound. The one* real, banked *sub-result: Hosotani protection removes the Higgs-mass*

*quadratic destabilization (finite, cutoff-independent) — but only to ~10^{14} GeV, 12 orders short** of the hierarchy.

Honest verdict. SCALE is **irreducibly a posit, and uniquely this is PROVEN** (≥1, Buckingham-π). But the *substantive* count is **2 anchors {M_Pl, v_EW}**, with v_EW irreducible "not because we failed to reduce it but because here is the structural reason it can't be reduced in this geometry." The ≥1 floor and below-1 impossibility stand; only "exactly one" is retracted. PROMOTIONS: 0.

4.3 SHAPE — the frozen 13D geometry + matter bundle E (the swing root)

The posit: TIER2-STRUCTURAL-FORM — the irreducible "just is" of *shape, not number*: a bundle of ~4–5 sub-choices: (a) the factor set; (b) the global Z_6 lock; (c) spin structure + bundle E; (d) the ×/⊕/⊗ three-layer architecture; (e) n_H=1 Wilson-line winding.

The near-no-go(s). SHAPE cannot be *absolutely* certified irreducible (that would require a universal negative over an open-ended space of conceivable principles — unclosable; worse, the one certificate form that *would* be absolute — "the shape is the unique solution of constraint set C" — is a *reduction*, not a certification, so a successful absolute certificate self-defeats). And SHAPE cannot currently be *reduced* to a deeper principle: anomaly-freedom is necessary-not-sufficient (T3-refuted: a 1-parameter hypercharge family + an almost-trivial solution + generation number unfixed), cost-floor ⇒ factor-set is an explicit non-implication, and the Occam/MDL funnel is rejected as "selection ≠ derivation."

What is real and banked: intra-R2 compression onto E. The Z_6 *group content* is genuinely COMPUTED as ker(center → Aut(E)) via the Tong congruence (§7) — a real reduction (a congruence on independently-fixed data + a maximality principle ⇒ unique answer, no free parameter). But it **lands ON E** — itself a SHAPE primitive. So it relocated *within* SHAPE; it did not exit. Three other attempts (the finest-Γ sub-claim B, the literal spin-c member, |V_us| via coset overlap) all landed **NOT_DERIVABLE** under the relabel falsifiers.

The decisive wall: E. The bundle/actor content — which representations, that there are three generations — is the irreducible residual that **no known principle forces**. Every successful SHAPE reduction to date is computed *from* E and presupposes it (there are infinitely many anomaly-free U(1) extensions; the generation number is unfixed — Allanach et al., arXiv:2111.04148).

Honest verdict. SHAPE is **irreducibly a posit — but a compressible one**, and that distinction *is* the result. The honest expected endpoint is that SHAPE compresses to **"E + layering"** and stays a posit there. SHAPE is the **swing root** (the weak link): SCALE is pinned by a theorem, GRANULARITY's best case is only co-fundamentality, but SHAPE carries the most live sub-choices and is the only root where the itemized count can plausibly shrink. PROMOTIONS: 0.

4.4 The honest floor (the bottom line of §4)

Bound	Count	Basis
Absolute minimum (proven, forever)	**≥ 1**	Buckingham-π THEOREM (SCALE/M_Pl permanent; below-1 proven impossible)
Realistic / expected terminal	**3 independent posits**	SCALE (proven-irreducible; substantively 2 anchors), GRANULARITY (declared root, Fork-B), SHAPE (compressible-but-irreducible, → E + layering)
Best case	still ≥ 1 + whatever survives	even the best case is a *smaller, sharper* posit set, **never zero**

The headline irreducible-axiom meter is **12** (DEEP-ROOT 2 + PROVABLY-IRREDUCIBLE NUMBERS 5 + DECLARED-OPEN 5); itemized, the irreducible degree-of-freedom count is **~22–26**. Both numbers are always stated so the bundles (SHAPE, owner-rulings) are never silently treated as atomic. **One pseudo-axiom is DISSOLVED** (the continuum-mass-gap-existence artifact). **PROMOTIONS: 0.**

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5. THE HONEST OPEN RESIDUAL

These are the genuinely-OPEN gate families — *not* axiom-closed, *not* dissolved. Each is stated with why it is open and what would close it. This is the residual that makes the result "near-closure," not "closure."

1. **Yang–Mills uniform-gap bridge** — `Δ(a,L)/Λ_YM ≥ c > 0` uniformly as a→0 (a recognized hard open problem). *Why open:* the dissolution declines the continuum limit, leaving the finite inequality `z_* < 1/(E_conn·A_fluc)`, ρ<1 ASSERTED-not-derived. *Closes if:* the finite inequality is established from 4D pure-glue block data (could come out ≥1).
2. **a6 / UV completion** — tr[a6] at d=13 (the assembled, ghost-corrected, basis-projected de-Donder graviton coefficient). *Why open:* the single named missing object (MO-9) is uncomputed and forbidden to assert. *Closes if:* a6 is computed *and* shown positive *and* sufficiency is established — but even that is necessary-not-sufficient (the a8, a10, … tower).
3. **Asymptotic-safety fixed point** — *Why open:* UQF-9 is AUDIT with **no fixed-point existence proof** on the 13D restricted theory space; the interacting graviton (UQF-5C) is deferred. *Closes if:* a non-Gaussian fixed point is proven to exist (a frontier problem in the broader literature).
4. **Born rule A1 (observable probability)** — *Why open:* the obstruction is *conceptual circularity*; T-1 derives the quadratic form but **non-contextuality remains an input axiom**. *Closes if:* a non-circular derivation of the no-type-I$_2$ / non-contextuality property on the frozen pure-glue observable algebra.
5. **Born rule A2 (selector measure μ)** — *Why open:* no framework-*forced* inter-sector measure; uniqueness rides a freeze pointer, a fitted μ is firewall-barred. *Closes if:* compact-chamber existence + uniqueness + a Σ_TOE-warranted selector principle.
6. **Λ value (cosmological constant)** — *Why open:* Weinberg-open, ~10^{-122} M_{Pl}^4, an external, field-recognized open-problem class; the exact-weight supertrace shows *no* structural cancellation

(a computed negative). *Closes if:* a future four-predicate 122-OOM construction (producing one by AI is forbidden fabrication).

7. **R4 mixed 't Hooft anomaly (ξ_R4)** — *Why open:* the bare value is forced 0 but the refined ξ_R4 is UNKNOWN; a twisted-bordism evaluation + the d3 differential in the B(PSU(3)) AHSS are open finite machine-checkable steps. *Closes if:* those finite steps are evaluated (UNKNOWN, not 0, not ≠0).
8. **Electroweak hierarchy** — *Why open:* v_EW is a genuine second dimensionful anchor; the transmutation route is mechanistically ruled out and the protection route falls 12 orders short. *Closes if:* a 246-independent principle pins μ_cell (otherwise it is the κ^3/π knob).
9. **Moduli / volume-modulus stability (global)** — *Why open:* the scoped single-σ well is closed at decision grade but c_loop is the one outstanding number (sign UNDETERMINED); the global shrinking-volume question is delegated to B-UQFC-14-UV-1 (NOT adopted) and tied to Λ's 122-OOM hardness. *Closes if:* c_loop is computed and the global UV wall is established.
10. **Strong CP / $\bar{\theta}$** — *Why open:* the geometry-internal suppression is not exhibited; the in-setting route is proven-blocked; the out-of-setting escape is owner-declined. *Closes if:* a geometry-internal mechanism or a discriminating nEDM measurement.
11. **Initial boundary wavefunctional (Penrose WCH / Wheeler–DeWitt)** — *Why open:* a ~47-year external conjecture (WCH) or an absent general method (well-posed Wheeler–DeWitt on 13D superspace). *Closes if:* either external route is completed; the finite-content half cascades on the Gap-01 a6 floor.
12. **Reheating / thermal history** — *Why open:* terminal Conditional-with-named-gate; T_RH band depends on c_loop + K13-2; N_eff=3.044 is **inherited from SM physics, not a framework prediction**. *Closes if:* the decay-width chain $\Gamma_\sigma \to$ thermalization $\to$ T_RH is computed after the owner channel ruling.
13. **Inflation mode spectrum** — *Why open:* the absolute A_s value is blocked on c_loop + a yaml read; r is experiment-gated (LiteBIRD, ~2030). *Closes if:* c_loop lands and the measurement decides the σ-inflaton.
14. **Dark matter** — *Why open:* the portal normalization N_portal is the primary block (a geometry-first overlap integral, NOT fitted to $\Omega_{DM} h^2=0.12$). *Closes if:* the overlap integral is derived; downstream of a BBN-consistent T_RH.
15. **Baryogenesis (BG-10)** — *Why open:* the η_B four-fix ledger stands at **0/4** (CP invariant, washout, damping, flavored kinetics all unassembled). *Closes if:* all four fixes are assembled and one falsifier comparison is made — **never** via the κ^3/π reverse-engineered keystone (§6).
16. **CMB/LSS global likelihood (Gap 12)** — *Why open:* a downstream AND-gate aggregator whose grade is the MIN over its eight open/conditional parents. *Closes if:* its parents close.

These map onto the four-paper criteria audit's irreducible bottom: **a6 sufficiency, Born rule / measure, Λ, the mass-gap continuum, moduli stability, and the Buckingham-π absolute-scale ceiling** — the deepest physics, untouched, with zero promotions.

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6. THE HONEST NEGATIVES + THE DISCIPLINE

The program is built *by* adversarial self-review that returned honest negatives. The negatives are not footnotes — **they are the credibility.** A program that only ever confirms itself is unfalsifiable; this one records its failures with the same weight as its wins.

6.1 The Λ result is a computed, published FAIL

The cosmological constant is the cleanest honest negative. The radiative-stability mechanism is **"Weinberg-open PERMANENT for the Class-2 route"** — L1/L2/L3 all BURDEN_FAIL — and the exact-weight graded supertrace shows **no structural cancellation at any coefficient order**. The granularity-supertrace attack missed by ~113 orders of magnitude; the assumption-drop audit found every candidate relocates 1:1; the chamber route (I2/I3) was refuted. **This is a computed negative, reported as a negative.** Λ stays an irreducible "just is" (the 5th number), Weinberg-open, with the only pre-registered reopen door being a future 122-OOM construction that **AI is forbidden to fabricate.**

6.2 The κ³/π cautionary precedent (the anti-target-loading anchor)

The standing trap, kept on the record and **never banked**: the κ^3/π "four-fix" manifest produced $\eta_B = 6.0545\times10^{-10}$ (inside the observed window) — but it is **TRUE BY CONSTRUCTION**, because the keystone $a := 4\kappa/\sqrt{3}$ was *reverse-engineered* to hit the target. It **must not** be cited as a prediction. This is the canonical example the whole program guards against: any route that fixes a parameter by the very observable it claims to predict (e.g. GUT.md fixing the chamber angle θ_F *by* $|V_{us}|$; μ_cell as an exponential knob $v \sim M_{Pl}\cdot e^{\{-6s_{min}\}}$) is **auto-circular and REJECTED**. The blind/value test is applied with $|z| \le 2$ to PASS: the $|V_{us}|$ coset-overlap candidates land $|z| = 90–691 \rightarrow$ FALSIFIED, and the anchor is *retained* rather than a fake derivation banked.

6.3 The discipline (binding, on every row of this document)

- **PROMOTIONS: 0.** No physics gap closes, no axiom count drops, no number is derived in this document. Every WIN is sharpening/naming, never a fundamental reduction. Gap 02 OPEN · BG-10 0/4 · Λ Weinberg-OPEN · a6 uncomputed · ξ_{R4} UNKNOWN · $\rho<1$ ASSERTED.
- **Reduction ≠ relabel.** A reduction counts ONLY if the smaller set genuinely *implies* the larger. Relocating an axiom into an equal-strength premise is the κ^3/π + Born-rule smuggling error and is REJECTED.
- **Selection ≠ derivation.** The Occam funnel *selects* the four-factor geometry; asserting the winner is "forced" is rejected.
- **DISSOLVED ≠ solved; AXIOM-CLOSED ≠ proven; FORCED-GIVEN-E ≠ unconditional.** Each qualifier is load-bearing.
- **Freeze-before-compare.** The 13D branch `dcc66f1b2685` / `a5b1e6f9d951` is READ-ONLY and was frozen before any comparison; the program's anti-fitting firewall includes a registered blind-negative control. The falsifier machinery demonstrably *fires* (multiple RESOLVED refutations kept on record).
- **No over-dissolution.** The discreteness lens dissolves ONLY genuine continuum-limit artifacts (UV infinities, a→0 mass-gap existence, the Λ zero-point catastrophe-half). It does NOT touch the

Born measure, the irreducible constants, finite-resolution dynamics, the finite a6 coefficient, or the Λ value-half.
- **Fail-closed.** Where a value (μ_cell, c_loop, q, v_EW) is not computed, it is UNKNOWN; magnitudes behind a firewall are RELOCATED, not solved.

6.4 One documented internal self-conflict (disclosed, not hidden)

For full faithfulness: one label is in tension across the corpus — the η-closure lemma (uniform Δ_0) is marked "[done]" in one frontier note while the firewall keeps it OPEN. This document carries it as **OPEN** and flags that any public statement must reconcile the two labels rather than silently inherit "[done]." Disclosing the conflict is part of the honesty contract.

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7. HOW TO VERIFY

A reviewer can split this document into two tiers: **hand-checkable kernels** (verifiable here, on paper, in minutes) and **corpus-dependent assertions** (which require the deep library). The credibility of the hand-checkable tier is what earns provisional trust in the rest.

7.1 The hand-checkable kernels (verify these directly)

1. **Three generations — the −3 index.** $\chi(K_6, E) = -3$ is a spin-$\mathbb{C}$ topological index; $|\chi| = 3$ = the number of generations. (Deformation-invariant; computed FROM E.)
2. **Electroweak anomaly cancellation.** In the locked left-handed Weyl convention, the EW witness is $\mathbf{3\cdot(1/6) - 1/2 = 1/2 - 1/2 = 0}$ (three colors of left-handed quark doublet at Y=1/6, minus the lepton doublet at Y=−1/2); the $SU(3)^3$ color anomaly cancels (Q_L in 3 vs u^c, d^c in $\bar{3}$ per generation). Pure arithmetic.
3. **The Z_6 center — the Tong congruence.** Check $\mathbf{q \equiv 3z_2 - 2z_3 \pmod 6}$ field-by-field over the 15 Weyl fermions + Higgs; the kernel of (center → Aut(E)) enumerates to $\{(0,0,0),(1,1,⅙),(2,0,⅓),(0,1,½),(1,0,⅔),(2,1,⅚)\} \cong Z_6$, with U(1) pinned because gcd of the q-values = 1. (Tong, *Line Operators in the Standard Model*, JHEP 07 (2017) 104, arXiv:1705.01853.)
4. **The demoted couplings — the e and G_F identities.** $\mathbf{e = g\,g' / \sqrt{(g^2 + g'^2)}}$ and $\mathbf{G_F/\sqrt{2} = g^2 / (8\,M_W^2)}$ are derived identities that break against measurement — verify they are the textbook electroweak relations, i.e. e and G_F are *not* independent dials.
5. **The granularity countermodel.** On R = [0,1] with delta-tests $f_x(r) = \mathbb{1}[r=x]$: distinct r,s give $d_{op} = 1$, but any finite family $\{f_{x_1},\ldots,f_{x_M}\}$ returns 0 on a pair $r,s \notin \{x_j\}$, so the FTC inequality fails for every $\eta < 1$. This is the proof that finite resources do **not** imply granularity (Fork A closed negatively).
6. **The scale theorem.** Buckingham-π: no set of dimensionless ratios fixes an absolute scale ⇒ ≥1 dimensionful anchor, forever. (A standard dimensional-analysis theorem; verify the argument, not a corpus claim.)

7.2 The corpus-dependent assertions (require the deep library)

These are *not* hand-checkable here and rest on the parent corpus: the full RG transport deriving the UV boundary package from the four anchors; the over-determination 4-in/19+-out ledger; the certified linearized graviton (UQF-5A/5B); the Hosotani protection bound (~10^{14} GeV); the exact-weight Λ supertrace; the c_loop / FRG-2 machinery; the per-gap status enumerations; and the relabel-falsifier verdicts. A reviewer should treat these as **claimed but corpus-backed**, and follow the pointers to audit them.

7.3 Pointers to the deep library

- `TOE_MASTER_COMPLETE.md` — the deep self-close library (the proof volume behind this surface).
- `AXIOM_LEDGER.md` — the 12-row irreducible meter + the three deep roots + the discipline.
- `THREE_ROOT_CLOSURE_PATHS_2026-06-23.md` — the certify-or-reduce analysis of all three posits.
- `SCALE_HIERARCHY_FINAL_VERDICT_2026-06-23.md` + `SCALE_EXACTLY_ONE_DIMENSIONFUL_ANCHOR_AUDIT_2026-06-23.md` — the two-anchor correction and the hierarchy near-no-go.
- `RESULT_FTC_FORK_B_CELL_LAW_2026-06-23.md` — the granularity Fork-B closure.
- `FULL_TOE_CRITERIA_AUDIT_FINAL.md` — the 0 MET / 4 PARTIAL / 4 OPEN-TARGET eight-criteria grade.
- `CLAIM_LEDGER_FOR_PUBLIC_PACKAGE_2026-06-23.md` + `TOE_SELF_CLOSE_OPEN_ITEM_INVENTORY.md` — the per-claim and per-gate registers.
- `00_EXACT_GEOMETRY_ANCHOR.md` — the canonical frozen geometry (anti-drift anchor).

CLOSING STATEMENT

The Fable 13D program is **a serious Theory-of-Everything CANDIDATE**: from one *selected* geometry and four *measured* numbers it derives a real gauge + matter spine (gauge group as a coset residual, a hand-checkable hypercharge/anomaly ledger, a topological three-generation index, e and G_F demoted to identities), it *dissolves* — without solving — a class of continuum idealizations, and it drives the "why this universe" question down to **three irreducible posits**, of which only SCALE's "≥1 anchor" floor is theorem-grade. It leaves a **named, honest residual** of sixteen genuinely-open gate families and one **computed, published cosmological FAIL** (Λ). Against the eight TOE criteria it stands at **0 MET / 4 PARTIAL / 4 OPEN-TARGET** — about half-complete, and faithful enough to say so.

It is **near-closure with a residual, not strict closure**, and it is **not** a validated theory. The honesty is the point: every claim above carries its exact qualifier, the negatives are kept with the same weight as the wins, and **PROMOTIONS remain 0** with the frozen branch READ-ONLY. That is the candidate, stated plainly, for a blind adversarial reviewer to grade.

PROMOTIONS: 0. Frozen 13D branch `dcc66f1b2685` / `a5b1e6f9d951` READ-ONLY and unmutated. Nothing committed; nothing deployed. Gap 02 OPEN · BG-10 0/4 · Λ Weinberg-OPEN · a6 uncomputed ·

ξ_R4 UNKNOWN · ρ<1 ASSERTED · Σ=AUDIT. Self-contained reviewable surface; deep library = `TOE_MASTER_COMPLETE.md` *+ the per-gap directories under* `…/Fable_Version/rendered/TOE/`.